

ABSTRACT

In order to reduce the time until an acoustic wave is generated and perform heat exchange smoothly in a stack, a thermoacoustic apparatus 1 includes a first stack 3a sandwiched between a first high-temperature-side heat exchanger 4 and a first low-temperature-side heat exchanger 5 and a second stack 3b sandwiched between a second high-temperature-side heat exchanger 6 and a second low-temperature-side heat exchanger 7 in the inside of a loop tube 2, wherein a standing wave and a traveling wave are generated through self excitation by heating the first high-temperature-side heat exchanger 4, the second low-temperature-side heat exchanger 7 is cooled by the standing wave and the traveling wave, or/and a standing wave and a traveling wave are generated by cooling the first low-temperature-side heat exchanger 5, and the second high-temperature-side heat exchanger 6 is heated by the standing wave and the traveling wave. The standing wave and the traveling wave are generated in the state in which helium having a high sound velocity, a small Prandtl number, and a small specific gravity is enclosed in the loop tube and, thereafter, argon having a low sound velocity, a large Prandtl number, and a small specific gravity is injected.